Certificate

of Correction

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Date: April 10, 2006

To: U.S. Patent and Trademark Office

Attention: Certificate of Correction

Facsimile No.: 1-571-273-8300

Verification No.: 1-703-305-8309

Client No.: 41890-01280

From: Valerie L. Perry

Message:

Number of pages following this cover sheet: 15

If you need a confirmation or any of the pages sent again, please call our office at the following number: 303-338-0997. SENT BY: Valerie

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Patent of:

HAMPDEN-SMITH et al.

Patent No.: 6,875,372 B1

Issued: April 5, 2005

Confirmation No.: 7916

Atty. File No.: 41890-01280

For: "CATHODOLUMINESCENT PHOSPHOR POWDERS, METHODS FOR MAKING PHOSPHOR POWDERS AND DEVICES INCORPORATING SAME"

SECOND REQUEST FOR STATUS OF CERTIFICATE OF CORRECTION

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being transmitted via facsimile to the U.S. Patent and Trademark Office on the date shown below.

Print or Type Name: Valerie Peery

Signature: Valerie Peery

Date: 4-10-06

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In reviewing our file, we note that a Certificate of Correction has not been received in connection with the Request for Certificate of Correction of Patent which was mailed on April 15, 2005. Enclosed please find a copy of the Request for Certificate of Correction of Patent and the postcard received from the U.S. Patent and Trademark Office confirming receipt of the Request for Certificate of Correction. Applicant respectfully requests a status update with regard to the above-identified patent at your earliest convenience.

Respectfully submitted,

MARSH FISCHMANN & BREYFOGLE LLP

By: _____

David F. Dockery
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Facsimile: 303-338-1514

Date: April 10, 2006

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PATENT

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REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT FOR PTO MISTAKE
(37 C.F.R. 1.322(a))

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450 ON [illegible]

MARSH FISCHMANN & BREYFOGLE LLP

BY: [signature]

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is a request for a Certificate of Correction for PTO mistake under 37 C.F.R. 1.322(a). The errors in the patent are obvious typographical errors or omissions and the correct wording can be found in the Terminal Disclaimer having a mailing date of February 4, 2004, the original specification at Page 16, line 11, Page 24, line 14, Page 45, line 6, Page 68, line 15, Page 71, line 11, and Page 92, line 17, or the Response to Examiner's Action dated November 15, 2002, at Page 5, line 7. Attached is form PTO 1050 in duplicate along with copies of documentation that unequivocally supports patentee's assertion(s).

This is also a request in relation to the above-identified U.S. Patent for issuance of a Certificate of Correction for Applicant's mistake. The errors in the patent are obvious typographical errors. Attached in duplicate is form PTO 1050 and a check in the amount of $100.00 to cover the fee set forth in 37 C.F.R. Section 1.20(a). Please credit any over-payment or debit any underpayment to Deposit Account No. 50-1419.

Respectfully submitted,

MARSH FISCHMANN & BREYFOGLE LLP

By: _____

David F. Dockery
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Date: April 15, 2005

The PTO did not receive the following listed item(s) a check

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,875,372 B1
DATED : April 5, 2005
INVENTOR(S): HAMPDEN-SMITH et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title Page
Section (*), insert --This patent is subject to a terminal disclaimer.--

Column 1
Line 6, insert the following paragraph:
--STATEMENT REGARDING FEDERALLY-SPONSORED RESEARCH/DEVELOPMENT
This invention was made with Government support under contracts N00014-95-C-0278 and N00014-96-C-0395 awarded by the Office of Naval Research. The Government has certain rights in the invention.--

Column 9
Line 64, delete "a".

Column 14
Line 41, delete "atomizaton", and insert therefor --atomization--.

Column 26
Line 32, delete "vaporizaton", and insert therefor --vaporization--.

Column 39
Line 51, delete "br", and insert therefor --or--.

MAILING ADDRESS OF SENDER:
David F. Dockery
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MARSH FISCHMANN & BREYFOGLE LLP
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303-338-0997

PATENT NO. 6,875,372 B1

FORM PTO-1050

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,875,372 B1
DATED : April 5, 2005
INVENTOR(S): HAMPDEN-SMITH et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 41
Line 22, delete "particulary", and insert therefor --particularly --.

Column 45
Line 12, delete "10'", and insert therefor --10--.

Column 46
Line 5, delete "siid", and insert therefor --said --.

MAILING ADDRESS OF SENDER:
David F. Dockery
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303-338-0997

PATENT NO. 6,875,372 B1

FORM PTO-1050

Terminal Disclaim. To Obviate A Double Patenting Rejection Over A Prior Patent	Docket No. 41890-01280

In Re Application Of:

Hampden-Smith et al.

Serial No.	Filing Date	Examiner	Group Art Unit
09/751,341	December 29, 2000	Carol M. Koslow	1755

Invention:

CATHODOLUMINESCENT PHPOSPHOR POWDERS, METHODS FOR MAKING PHOSPHOR POWDERS AND DEVICES INCORPORATING SAME

Owner of Record:

Superior MicroPowders, LLC

TO THE COMMISSIONER FOR PATENTS:

The above-identified owner of record of a 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. 6,153,123 . The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors and/or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney of record.

Signature

Dated: Feb. 4, 2004

David E. Dockery
Typed or Printed Name

☐ Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.
☐ PTO suggested wording for terminal disclaimer was unchanged.
☐ Certification under 37 C.F.R. 3.73(b) is required if terminal disclaimer is signed by the assignee.

P32/REV01

Terminal Disclaimer To Obviate A Double Patenting Rejection Over A Prior Patent	Docket No. 41890-01280

In Re Application Of:
Hampden-Smith et al.

Serial No.	Filing Date	Examiner	Group Art Unit
09/751,341	December 29, 2000	Carol M. Koslow	1755

Invention:
CATHODOLUMINESCENT PHPOSPHOR POWDERS, METHODS FOR MAKING PHOSPHOR POWDERS AND DEVICES INCORPORATING SAME

Owner of Record:
Superior MicroPowders, LLC

TO THE COMMISSIONER FOR PATENTS:

The above-identified owner of record of a 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. 6,168,731 . The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors and/or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney of record.

Signature

Dated: Feb. 4, 2004

David F. Dockery
Typed or Printed Name

☐ Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.
☐ PTO suggested wording for terminal disclaimer was unchanged.
☐ Certification under 37 C.F.R. 3.73(b) is required if terminal disclaimer is signed by the assignee.

transducer housing 122. The transducer housings 122 are mounted to a transducer mounting plate 124, creating an array of the ultrasonic transducer discs 120. Any convenient spacing may be used for the ultrasonic transducer discs 120. Center-to-center spacing of the ultrasonic transducer discs 120 of about 4 centimeters is often adequate. The aerosol generator 106, as shown in Fig. 2, includes forty-nine transducers in a 7 x 7 array. The array configuration is as shown in Fig. 3, which depicts the locations of the transducer housings 122 mounted to the transducer mounting plate 124.

With continued reference to Fig. 2, a separator 126, in spaced relation to the transducer discs 120, is retained between a bottom retaining plate 128 and a top retaining plate 130. Gas delivery tubes 132 are connected to gas distribution manifolds 134, which have gas delivery ports 136. The gas distribution manifolds 134 are housed within a generator body 138 that is covered by generator lid 140. A transducer driver 144, having circuitry for driving the transducer discs 120, is electronically connected with the transducer discs 120 via electrical cables 146.

During operation of the aerosol generator 106, as shown in Fig. 2, the transducer discs 120 are activated by the transducer driver 144 via the electrical cables 146. The transducers preferably vibrate at a frequency of from about 1 MHz to about 5 MHz, more preferably from about 1.5 MHz to about 3 MHz. Commonly used frequencies are at about 1.6 MHz and about 2.4 MHz. Furthermore, all of the transducer discs 110 should be operating at substantially the same frequency when an aerosol with a narrow droplet size distribution is desired. This is important because commercially available transducers can vary significantly in thickness, sometimes by as much as 10%. It is preferred, however, that the transducer discs 120 operate at frequencies within a range of 5% above and below the median transducer frequency, more preferably within a range of 2.5%, and most preferably within a range of 1%. This can be accomplished by careful selection of the transducer discs 120 so that they all preferably have thicknesses within 5% of the median

An alternative, and preferred, flow for carrier gas 104 is shown in Fig. 14. As shown in Fig. 14, carrier gas 104 is delivered from only one side of each of the gas tubes 208. This results in a sweep of carrier gas from all of the gas tubes 208 toward a central area 212. This results in a more uniform flow pattern for aerosol generation that may significantly enhance the efficiency with which the carrier gas 104 is used to produce an aerosol. The aerosol that is generated, therefore, tends to be more heavily loaded with liquid droplets.

Another configuration for distributing carrier gas in the aerosol generator 106 is shown in Figs. 15 and 16. In this configuration, the gas tubes 208 are hung from a gas distribution plate 216 adjacent gas flow holes 218 through the gas distribution plate 216. In the aerosol generator 106, the gas distribution plate 216 would be mounted above the liquid feed, with the gas flow holes positioned to each correspond with an underlying ultrasonic transducer. Referring specifically to Fig. 16, when the ultrasonic generator 106 is in operation, atomization cones 162 develop through the gas flow holes 218, and the gas tubes 208 are located such that carrier gas 104 exiting from ports in the gas tubes 208 impinge on the atomization cones and flow upward through the gas flow holes. The gas flow holes 218, therefore, act to assist in efficiently distributing the carrier gas 104 about the atomization cones 162 for aerosol formation. It should be appreciated that the gas distribution plates 218 can be made to accommodate any number of the gas tubes 208 and gas flow holes 218. For convenience of illustration, the embodiment shown in Figs. 15 and 16 shows a design having only two of the gas tubes 208 and only 16 of the gas flow holes 218. Also, it should be appreciated that the gas distribution plate 216 could be used alone, without the gas tubes 208. In that case, a slight positive pressure of carrier gas 104 would be maintained under the gas distribution plate 216 and the gas flow holes 218 would be sized to maintain the proper velocity of carrier gas 104 through the gas flow holes 218 for efficient aerosol generation. Because of the relative complexity of operating in that mode,

due to thermophoresis. Fewer aerosol droplets would, therefore, be likely to impinge on conduit walls or other surfaces making the transition to the furnace.

Another way to reduce the potential for undesirable liquid buildup is to introduce a dry gas into the aerosol between the aerosol generator and the furnace. Referring now to Fig. 36, one embodiment of the process is shown for adding a dry gas 118 to the aerosol 108 before the furnace 110. Addition of the dry gas 118 causes vaporization of at least a part of the moisture in the aerosol 108, and preferably substantially all of the moisture in the aerosol 108, to form a dried aerosol 119, which is then introduced into the furnace 110.

The dry gas 118 will most often be dry air, although in some instances it may be desirable to use dry nitrogen gas or some other dry gas. If a sufficient quantity of the dry gas 118 is used, the droplets of the aerosol 108 are substantially completely dried to beneficially form dried precursor particles in aerosol form for introduction into the furnace 110, where the precursor particles are then pyrolyzed to make a desired particulate product. Also, the use of the dry gas 118 typically will reduce the potential for contact between droplets of the aerosol and the conduit wall, especially in the critical area in the vicinity of the inlet to the furnace 110. In that regard, a preferred method for introducing the dry gas 118 into the aerosol 108 is from a radial direction into the aerosol 108. For example, equipment of substantially the same design as the quench cooler, described previously with reference to Figs. 29-31, could be used, with the aerosol 108 flowing through the interior flow path of the apparatus and the dry gas 118 being introduced through perforated wall of the perforated conduit. An alternative to using the dry gas 118 to dry the aerosol 108 would be to use a low temperature thermal preheater/dryer prior to the furnace 110 to dry the aerosol 108 prior to introduction into the furnace 110. This alternative is not, however, preferred.

Still another way to reduce the potential for losses due to liquid accumulation is to operate the process with equipment configurations such that the aerosol stream flows in

deposition methods. Smoother phosphor powder layers are the result of the smaller average particle size, spherical particle morphology and narrower particle size distribution compared to phosphor powders produced by other methods. Smoother phosphor powder layers are valuable in various applications, especially those where the phosphor powders comprise an imaging device where a high resolution is critical. For example, a smoother phosphor powder layer in a display application where the phosphor layer produces light that is photographed results in improved definition and distinction of the photographed image.

A variety of deposition techniques often degrade the properties of the powders, especially brightness. An example is the three roll milling used to form pastes that are photoprinted, screen printed, directly written with a microsyringe and others. A method for increasing the brightness of the phosphor particles once deposited on the surface is to irradiate them with a laser (Argon ion, krypton ion, YAG, excimer, etc...). The laser light increases the temperature of the particles thereby annealing them and increasing the brightness. The laser heating of the particles can be carried out for particles on glass or even polymeric substrates since the laser causes local heating of the particles without heating the glass above its softening point. This approach is useful for phosphors.

The phosphor particle layer deposited onto a surface often needs to be coated to protect the layer from plasmas, moisture, electrons, photons, etc. Coatings can be formed by sputtering, but this requires a mask to avoid deposition onto undesired areas of the substrate. Laser-induced chemical vapor deposition (LCVD) of metal oxides and other materials onto particles can allow localized deposition of material to coat phosphor particles without coating other areas. The laser heating of the particles that drives the CVD can be carried out for particles on glass or even polymeric substrates because the laser causes local heating of the particles without heating the glass or polymer above its softening point.

and the number of layers of phosphor particles which are not involved in the generation of cathodoluminescence. That is, particles which are not excited by the electron beam will only inhibit the transmission of luminescence through the device. Large particles and aggregated particles both form voids and further contribute to loss of light transmission. Significant amounts of light can be scattered by reflection in voids. Further, for a high quality image, the phosphor layer should have a thin and highly uniform thickness. Ideally, the average thickness of the phosphor layer should be about 1.5 times the average particle size of the phosphor particles.

CRT's typically operate at high voltages such as from about 20 kV to 30 kV. Phosphors used for CRT's should have high brightness and good chromaticity. Phosphors which are particularly useful in CRT devices include ZnS:Cu or Al for green, ZnS:Ag, Au or Cl for blue and Y_2O_2S:Eu for red. The phosphor particles can advantageously be coated in accordance with the present invention to prevent degradation of the host material or diffusion of activator ions. Silica or silicate coatings can also improve the rheological properties of the phosphor slurry. The particles can also include a pigment coating, such as particulate Fe_2O_3, to modify and enhance the properties of the emitted light.

Other CRT-based devices operating on a similar principle are heads-up and heads-down displays. A heads-up display is a small, high resolution display that is placed in close proximity to the eyes of a user, for example a pilot, so that the display can provide information to the user without requiring the user to be distracted. Such displays should have high brightness and good resolution. Similarly, heads-down displays are utilized, for example, in airplane cockpits to provide data to the pilots. Such phosphors should also be bright and have a long lifetime. The small, spherical phosphor powders of the present invention are ideally suited for such applications.

The introduction of high-definition televisions (HDTV) has increased the interest in projection television (PTV). In this concept, the light produced by three independent

97. A cathodoluminescent display device, comprising:

a) an excitation source having an excitation potential of not greater than about 6 kV; and

b) at least a first layer of cathodoluminescent phosphor particles adapted to be stimulated by said excitation source, wherein said phosphor particles have a weight average particle size of from about 0.1 μm to about 10 μm, a substantially spherical morphology and wherein at least about 80 weight percent of said particles are not larger than about two times said average particle size.

98. A cathodoluminescent display device as recited in Claim 97, wherein said phosphor particles have a weight average particle size of from about 0.3 μm to about 5 μm.

99. A cathodoluminescent display device as recited in Claim 97, wherein said particles comprise Y_2O_3 and from about 4 to about 6 atomic percent Eu.

100. A cathodoluminescent display device as recited in Claim 97, wherein said particles comprise Zn_2SiO_4 and from about 0.05 to about 2 atomic percent Mn.

101. A cathodoluminescent device as recited in Claim 97, wherein said particles comprise Y_2SiO_5 and a dopant selected from the group consisting of Tb and Ce.

102. A cathodoluminescent device as recited in Claim 97, wherein said particles comprise $SrGa_2S_4$ and a dopant selected from the group consisting of Eu and Ce.

103. A cathodoluminescent display device as recited in Claim 97, wherein said device is a field emission display.

In the Claims:

80. (Amended) A cathodoluminescent device, comprising:

a) an excitation source; and

b) at least a first layer of cathodoluminescent phosphor particles selected from the group consisting of Y_2O_2S, ZnS, Zn_2SiO_4, $SrGa_2S_4$ and Y_2SiO_5 that are adapted to be stimulated by said excitation source, wherein said phosphor particles have a weight average particle size of from about 0.1 μm to about 10 μm, a substantially spherical morphology and wherein at least about 80 weight percent of said particles are not larger than about two times said average particle size.

Please cancel Claims 85 and 89.

97. (Amended) A cathodoluminescent display device, comprising:

a) an excitation source having an excitation potential of not greater than about 5 kV; and

b) at least a first layer of cathodoluminescent phosphor particles selected from the group consisting of Zn_2SiO_4, Y_2SiO_5 and $SrGa_2S_4$ that are adapted to be stimulated by said excitation source, wherein said phosphor particles have a weight average particle size of from about 0.1 μm to about 10 μm, a substantially spherical morphology and wherein at least about 80 weight percent of said particles are not larger than about two times said average particle size.

Please cancel Claim 99.

104. (Amended) A cathodoluminescent display device, comprising:

a) an excitation source having an excitation potential of at least about 20 kV; and

b) at least a first layer comprising Zn_2SiO_4 cathodoluminescent phosphor particles adapted to be stimulated by said excitation source, wherein said phosphor particles have a weight average particle size of from about 0.1 μm to about 10 μm, a substantially spherical morphology and wherein at least

Attorney: DFD/vlp Date: April 15, 2005

PTO Stamp indicates receipt of: [X] Patent Matter [ ] Trademark Matter
Application Docket No.: 41890-01280
Applicant: HAMPDEN-SMITH et al.
Title or Mark: CATHODOLUMINESCENT PHOSPHOR POWDERS, METHODS FOR MAKING PHOSPHOR POWDERS AND DEVICES INCORPORATING SAME
Serial/Reg. No.: 6,875,372 B1
Filed/Issued Date: April 5, 2005
[X] Certificate of Mailing
[ ] Express Mail No.:
[X] Check for $100.00

APR 19 2006

No. of Pages in Specification
No. of Pages in Claims
No. of Pages in Abstract
No. of Sheets of Drawings

LIST ALL DOCUMENTS BEING SENT TO PATENT OFFICE:

1. REQUEST FOR CERTIFICATE OF CORRECTION OF ISSUED PATENT
2. FORM PTO 1050 IN DUPLICATE
3. COPIES OF DOCUMENTATION THAT SUPPORT PATENTEE'S ASSERTIONS